UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

II.1

SUBJECT: PCB Survey, 6-2-75 DATE: July 16, 1975

FROM: J. N. Blazevich
Chemist, EPA Laboratory JNB

TO: Francis Nelson
Chief, Technical Support Branch

As part of a continuing effort to determine the extent of pollution and subsequent migration of PCB's resulting from a PCB spill at slip one on September 13, 1974, a fifth sampling trip was conducted in the area. This trip of June 2 and 4, 1975 resulted in the successful collection of over forty bottom sediments which, when analyzed, would allow us to determine what portion of the river is most contaminated and if a second dredging action should be initiated to remove the remaining PCB's.

I have completed both the field work and most of the laboratory analyses. The results found in table one and shown in map one indicate a significant quantity of PCB's present in the slip at this time. Further, only a small amount of PCB was found in the channel in the surface sediments (2-3 cm depth). When compared to the results obtained on my forth sampling trip in November 1974, a decrease of PCB in the river channel and a spreading-out of remaining PCB's toward the rear of the slip was noted.

As of today, the results of all my sampling trips suggest two important trends. First, a quantity of PCB's found its way into the river channel at the time of the spill when the river flow was low and drifted upstream during the dredging operation which followed. The suspended material from the dredging moved out and up the river channel in a direction similar to the known sediment transport in the salt wedge(a). Second, during the following months, November 1974 to June 1975, PCB's in the river channel and slip were covered with silt generated by seasonally high river flows. It is assumed that during this time tidal action and ship traffic in the slip resuspended the bottom sediments carrying PCB's that settled in the rear of the slip. The suggestion of silt coverage of PCB contaminated sediments is not unreasonable since approximately three inches of new sediment deposition in seven months was observed in the slip by members of the sampling team. Also, the Army Corps' data on sedimentation in the Duwamish River at the First Avenue bridge shows the rate of sedimentation to be 15 cm per year (b). Of course, other mechanisms for mixing, spreading, and covering of PCB's could be operating, but ship traffic, river flow, tidal action and dredging are assumed to be most responsible for what was observed in and near slip one.

Based on the above and the work of Blazevich and Pavlou(c), we can predict what will happen if PCB's are allowed to remain in the waterway. According to Blazevich and Pavlou, the distribution of PCB's in Duwamish River sediments is one of a gradual build-up from low levels near the Renton Sewer Treatment Plant (RSTP) to high values in the west waterway (see map 2). This picture has the appearance of the existence of an upstream source spreading PCB throughout the river channel. But no significant upstream source has been located (the RSTP output accounts for only 10% of the PCB burden in the estuary (D)). On the contrary, at least two important point sources in the lower Duwamish are thought to exist. One, in the slip four area, which is as of yet undetermined,and another PCB spill reported to occur within the last five years in the middle of the estuary (E). Probably other spills and yet to be determined point sources have or do exist as well. From this, one can suggest that even though a point source discharge or spill existed, the PCB's eventually spread through the river forming a gradient distribution pattern.

One can further suggest that given the tidal action, river flows, ship traffic and maintenance dredging that will occur, the PCB's in slip one will eventually spread throughout the river, adding additional PCB's to the already heavily polluted sediments (b,c).

cc: Arnold Gahler

(a) Effects of dredging on Water Quality and Sediment Transport in the Duwamish Estuary. Stevens, Thompson and Runyan, Inc., November 1972.

(b) U. S. Army Corps of Eng. 1973, 1974 Sounding Survey photo-maps of Duwamish River, 1973 and 1974. U. S. Army Eng. District Seattle File No. E12-2.1-70 and E12-2.1-71.

(c) Blazevich and Pavlou (unpublished results)

(d) Blazevich (unpublished results)

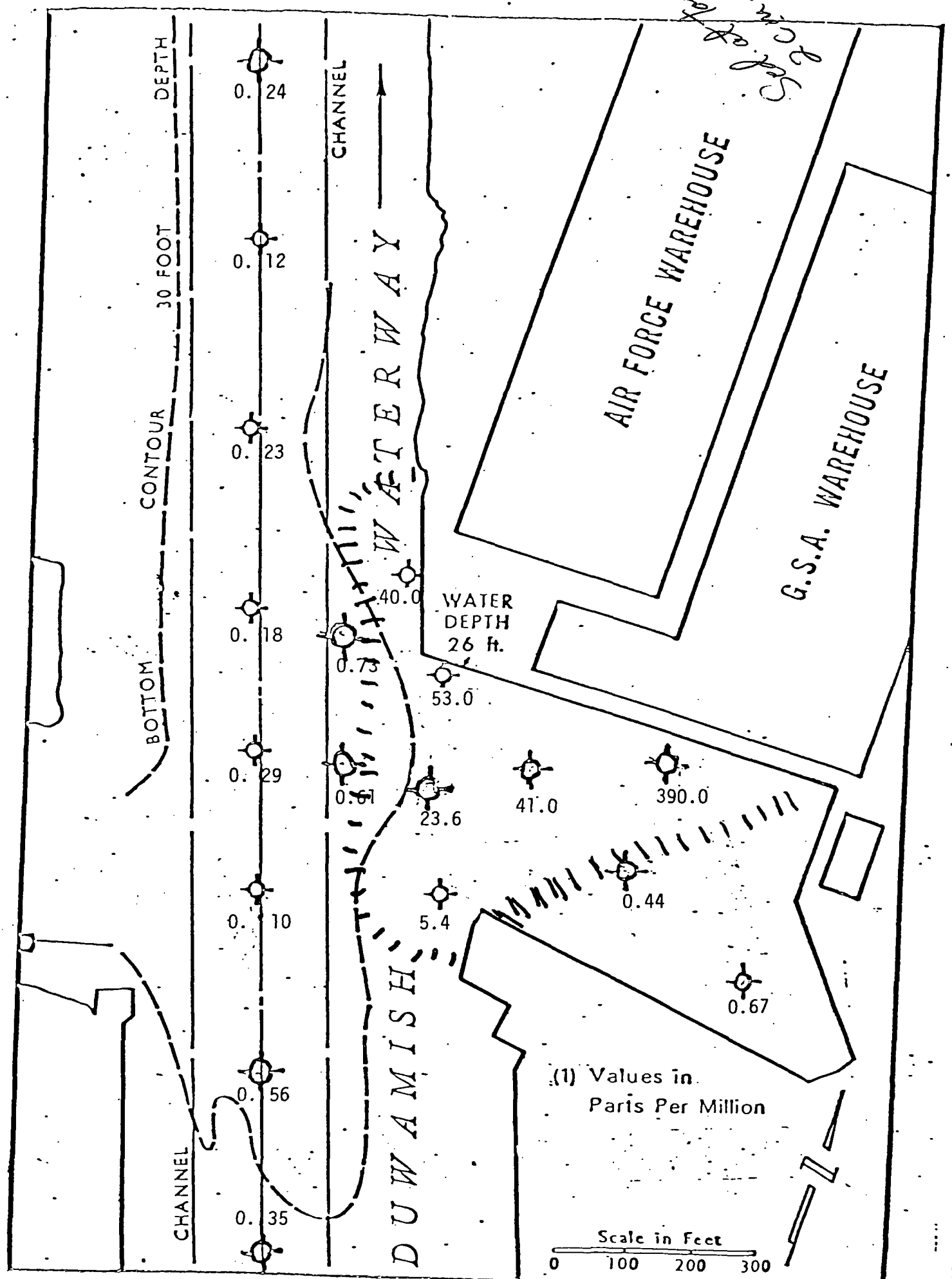
(e) Personal Comm., F. Nelson, EPA, Region X

TABLE 1

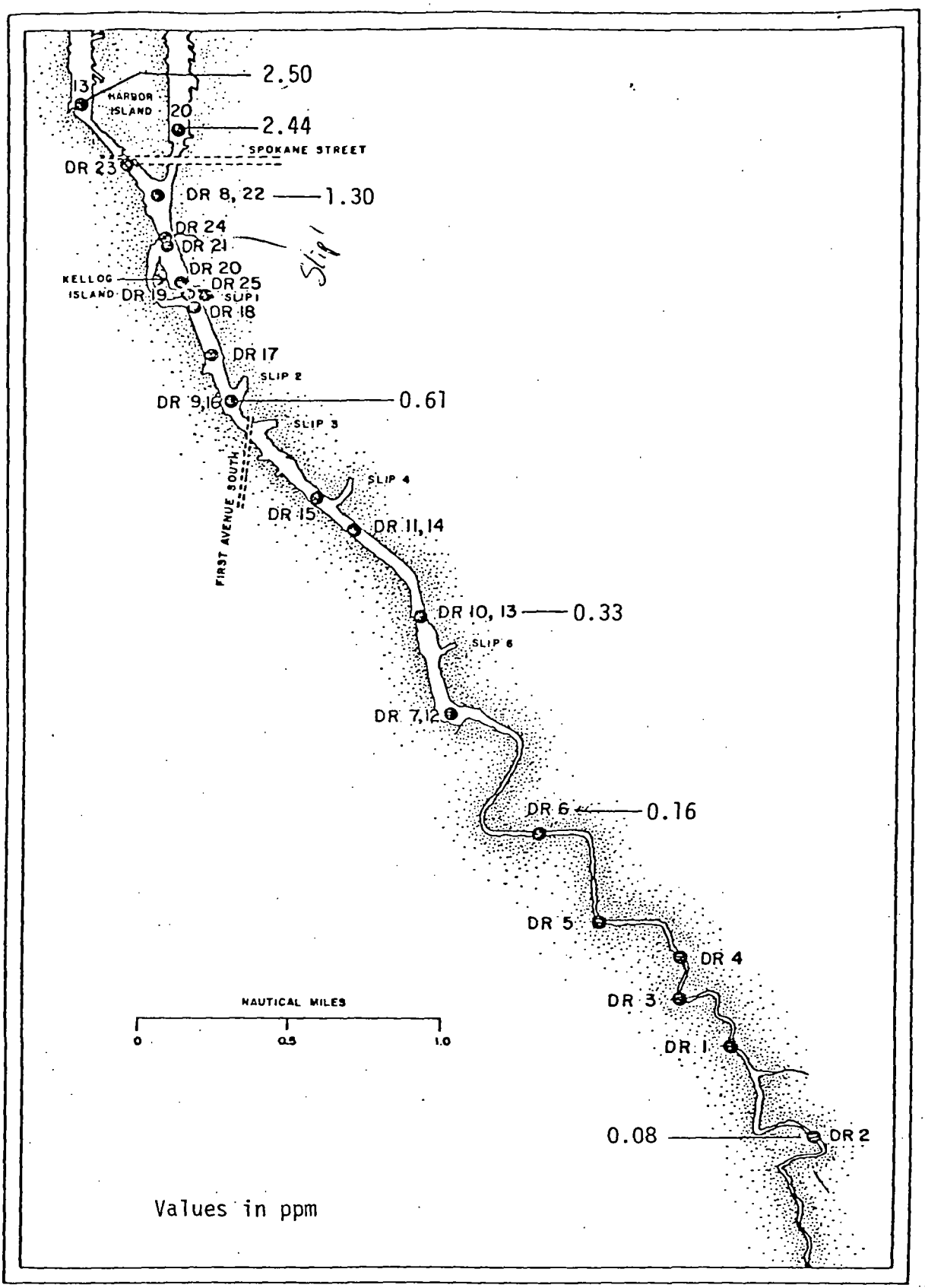
PCB in Sediments (ppm)

| Sample | 1242 | 1248/54 |
|---|---|---|
| 24202 | 0.149 | 0.056 |
| 24203 | 0.370 | 0.160 |
| 24205 | 0.167 | 0.051 |
| 24207 | 0.345 | 0.123 |
| 24208 | 0.560 | 0.170 |
| 24209 | 0.070 | |
| 24213 | 0.180 | 0.020 |
| 24215 | 0.244 | 0.113 |
| 24216 | 0.122 | 0.043 |
| 24217 | 0.220 | 0.060 |
| 24218 | 0.750 | 0.010 |
| 24219 | 0.190 | 0.050 |
| 24222 | 0.280 | 0.060 |
| 24223 | 0.610 | 0.140 |
| 24224 | 23.2 | |
| 24225 | 50.0 | |
| 24226 | 42.0 | |
| 24227 | 380.0 | |
| 24228 | 0.460 | 0.070 |
| 24229 | 0.640 | 0.140 |
| 24230 | 6.1 | |
| 24231 | 20.5 | |
| Recoveries | 76-96% | |
| Blanks | <0.010 | <0.010 |

MAP 1


DEPTH
30 FOOT
CONTOUR
BOTTOM
CHANNEL
0. 24
0. 12
0. 23
0. 18
0. 29
0. 10
0. 56
0. 35
CHANNEL
WATERWAY
DUWAMISH
AIR FORCE WAREHOUSE
G.S.A. WAREHOUSE
40.0
WATER DEPTH 26 ft.
0.73
53.0
0.61
23.6
41.0
390.0
0.44
5.4
0.67
(1) Values in Parts Per Million
Scale in Feet
0 100 200 300

MAP 2




PCB in Duwamish Sediments